

Application No.: 10/800,230

Docket No.: TOW-067

REMARKS

Applicants amend claims 1 and 4, and cancel claims 2 and 5. Claims 1, 3, 4, 6 and 7 are pending, of which claims 1 and 4 are independent. No new matter has been introduced. Applicants respectfully submit that the pending claims define over the art of record.

Rejection of Claims 1, 3, 4, 6 and 7 under 35 U.S.C. §102**The Dickman Reference**

Claims 1, 3, 4 and 6 are rejected under 35 U.S.C. §102(b) as being anticipated by United States Patent Publication Number 20030008186 to Dickman et al (hereafter "Dickman"). Claim 7 is rejected under 35 U.S.C. §102(b) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over the Dickman reference.

The Dickman reference is generally directed to a feedstock mixing apparatus for fuel processing systems. The fuel processing system includes one or more fuel processors adapted to produce a product hydrogen stream from a feed stream containing water and a carbon-containing feedstock. The fuel processing system may also include one or more fuel cell stacks that are adapted to produce an electric current from the product hydrogen stream produced by the fuel processing system.

Applicants respectfully submit that the Dickman reference does not disclose "a cooling mechanism provided between said reforming mechanism and said PSA mechanism," as recited in amended independent claim 1. The Examiner cites elements in Figure 15 of the Dickman reference as disclosing the features of claim 1. However, the Dickman reference does not disclose a cooling mechanism between the reforming region 32 and the purification region 38 (Dickman, Figure 15).

Applicants also respectfully submit that the Dickman reference does not disclose that the reforming mechanism includes "an evaporator for changing water into steam," or that the PSA mechanism includes "an off-gas tank" which is connected to the evaporator, as recited in amended independent claims 1 and 4. The Dickman reference does not disclose that the

Application No.: 10/800,230

Docket No.: TOW-067

reforming region 32 includes an evaporator, or that the purification region 38 includes an off-gas tank connected to an evaporator (Dickman, Figure 15).

Applicants further respectfully submit that the Dickman reference does not disclose that "said oxygen is supplied to said ATR separately from said water," as recited in amended independent claims 1 and 4. The Dickman reference teaches a feedstream 16 which enters the reforming region 32, and a mixed gas stream 36 containing hydrogen gas and other gases which enters the purification region 38 (Dickman, Figure 15). The Dickman reference does not disclose that the oxygen is supplied to the reforming region 32 separately from the water.

In light of the foregoing arguments, Applicants respectfully submit that the Dickman reference does not disclose each and every element of independent claims 1 and 4. Applicants respectfully request that the 35 U.S.C. §102(b) rejection of claims 1 and 4 in view of the Dickman reference be withdrawn. Reconsideration and allowance of claims 1 and 4 is requested in view of the above remarks.

Claim 3 depends upon claim 1 and adds separate and patentable limitations to claim 1. Claims 6 and 7 depend upon claim 4 and add separate and patentable limitations to claim 4. As such, Applicants respectfully submit that the dependent claims also define over the art of record.

The Woods Reference

Claims 1-3 are rejected under 35 U.S.C. §102(e) as being anticipated by United States Patent Publication Number 2003/0046867 to Woods (hereafter "Woods").

The Woods reference is generally directed to systems for generating hydrogen gas for use industrial and fuel cell applications. HRSG 90 in the Woods reference corresponds to the cooling mechanism of the present invention. In the Woods reference, water 17 used for reforming is introduced through pipes 18 to pass through HRSG 90 (Woods, paragraph 39). Therefore, it is not possible for HRSG 90 to evaporate the water 17 to get sufficient steam until the gas passing through discharge pipe 74 of ATR 70 becomes hot.

Applicants respectfully submit that the Woods reference does not disclose that the ATR includes "an evaporator for changing water into steam," as recited in claim 1. In the Woods

Application No.: 10/800,230

Docket No.: TOW-067

reference, water 17 and oxygen used for reforming is introduced through pipe 82 (Woods, Figures 2 and 4). As mentioned above, because HRSG 90 cannot produce sufficient steam at the start of the operation, it is necessary to obtain steam from the water introduced through pipe 82. Here, the water 17 is introduced through pipe 82 for humidification of the conditioned oxygen containing gas stream 21 in HS 83 (Woods, paragraph 21), so that evaporation efficiency of the water itself is low. The Woods reference does not disclose that the ATR 70 includes an evaporator. Therefore, PSA tail-gas combustor 80 is required to generate a large amount of heat for evaporating the water from pipe 82 to obtain sufficient steam.

Applicants also respectfully submit that the Woods reference does not disclose that the PSA mechanism includes "an off-gas tank," as recited in claim 1. In the Woods reference, since an off-gas is not supplied to PSA tail-gas combustor 80 at the start of operation, natural gas as raw fuel is supplied to PSA tail gas combustor 80, resulting in the waste of a lot of precious raw fuel at the start of operation.

Applicants further respectfully submit that the Woods reference does not disclose that "said oxygen is supplied to said ATR separately from said water," as recited in claim 1. In the Woods apparatus, humidified oxygen is passed into the ATR 70 through pipe 86 (Woods, Figure 4). The Woods reference does not disclose introducing oxygen and water separately into the ATR.

In contrast, in the present invention, because the PSA mechanism includes an off-gas tank, the off-gas stored in the off-gas tank can be used as a fuel for combustion to produce steam even at the start of operation. In addition, because water used for reforming is supplied to the reforming mechanism without passing through the cooling mechanism, and because oxygen does not pass through the evaporator, evaporation is efficiently undertaken in the evaporator. It is possible for the present invention to quickly produce steam required for reforming. As a result, the present invention provides a compact fuel gas production apparatus and fuel cell system with efficient and quick start-up.

In light of the foregoing arguments, Applicants respectfully submit that the Woods reference does not disclose each and every element of independent claim 1. Applicants respectfully request that the 35 U.S.C. §102(b) rejection of claim 1 in view of the Dickman

Application No.: 10/800,230

Docket No.: TOW-067

reference be withdrawn. Reconsideration and allowance of claim 1 is requested in view of the above remarks.

Claim 3 depends upon claim 1 and adds separate and patentable limitations to claim 1. As such, Applicants respectfully submit that the dependent claim also defines over the art of record.

Rejection of Claims 4-7 under 35 U.S.C. §103

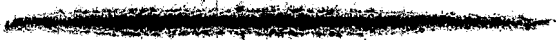
The Dickman Reference

Claim 7 is rejected under 35 U.S.C. §102(b) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over the Dickman reference. Claim 7 depends upon independent claim 4. In view of the above arguments, Applicants respectfully submit that the Dickman reference fails to teach or suggest each and every element of amended independent claim 4. Claim 7 depends upon claim 4 and adds separate and patentable limitations to claim 4. As such, for this and the reasons set forth above, Applicants respectfully submit that the dependent claim defines over the art of record.

The Woods Reference

Claims 4-6 are rejected under 35 U.S.C. §103(a) as being unpatentable over the Woods reference in view of the Dickman reference. In view of the above arguments, Applicants respectfully submit that the Woods and Dickman references, alone or in any combination, fail to teach or suggest at least the following features of independent claim 4: the ATR includes "an evaporator for changing water into steam," that the PSA mechanism includes "an off-gas tank," and that "said oxygen is supplied to said ATR separately from said water."

Claims 5 and 6 depend upon claim 4 and add separate and patentable limitations to claim 4. As such, for this and the reasons set forth above, Applicants respectfully submit that claims 4-6 define over the art of record.



Application No.: 10/800,230

Docket No.: TOW-067

CONCLUSION

In view of the foregoing amendments and arguments, Applicants believe the pending application is in condition for allowance.

Applicants believe that no fee is due with this statement. However, if a fee is due, please charge our Deposit Account No. 12-0080, under Order No. TOW-067 from which the undersigned is authorized to draw.

Dated: September 13, 2007

Respectfully submitted,

By 

Anthony A. Laurentino

Registration No.: 38,220

LAHIVE & COCKFIELD, LLP

One Post Office Square

Boston, Massachusetts 02109-2127

(617) 227-7400

(617) 742-4214 (Fax)

Attorney/Agent For Applicant